

Handling module HSP

FESTO



Characteristics

At a glance

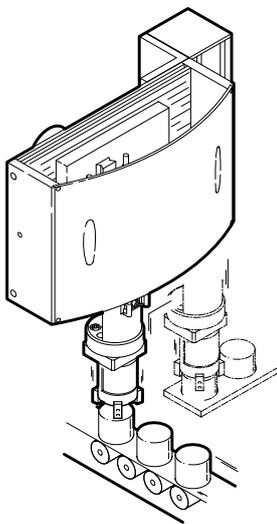
- The handling module is a new generation of function modules for automatically transferring, feeding in and removing small parts in very confined spaces
- This is achieved via a force-guided vertical and horizontal motion sequence. A backlash-free cross guide with recirculating ball bearing components ensures high precision and good rigidity
- By combining a semi-rotary drive with a slotted guide, a compact unit for a complete pick and place cycle is created

Advantages:

- Small installation space
- Extremely short cycle times
- Easy to commission

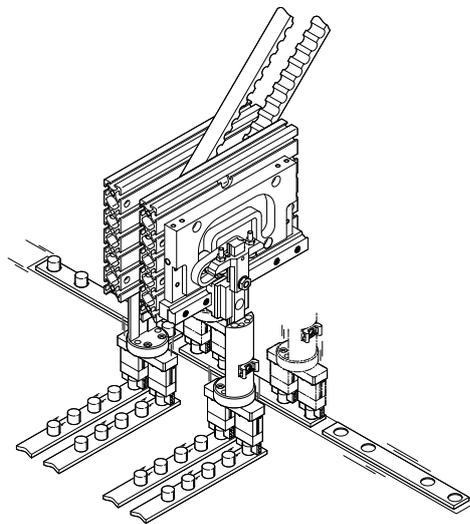
Drive system

[AP] Pneumatic semi-rotary drive



Fast feeding and removal, e.g. at the linear transfer or at the rotary indexing table

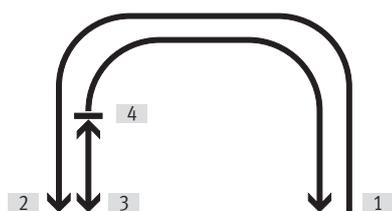
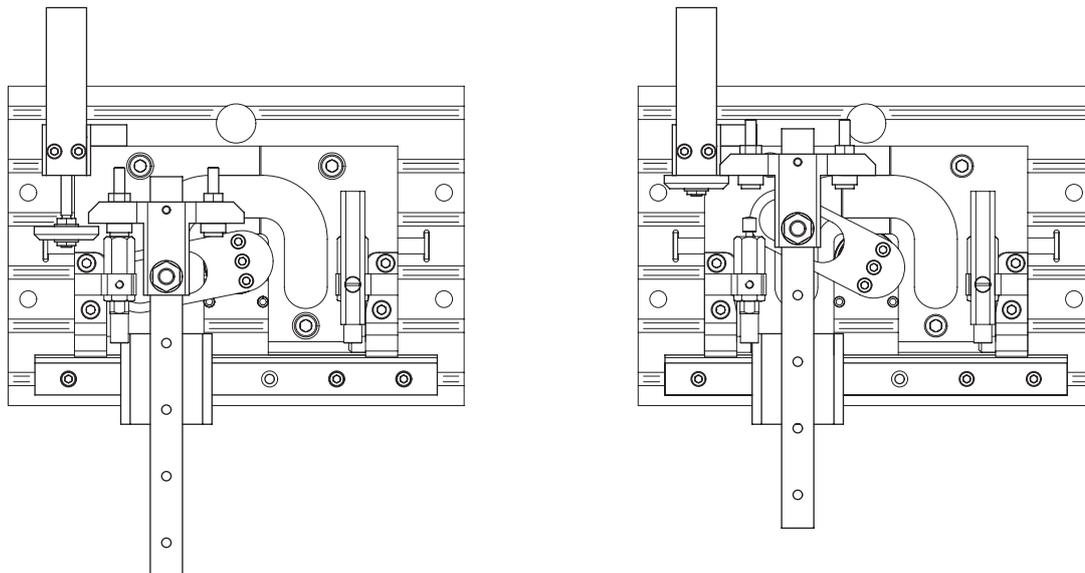
[AS] Drive shaft



Compact tandem pick and place at the linear transfer

Characteristics

Wait position module



Note:

When combined with the wait position module, the handling module HSP must be controlled using a 5/3-way valve (normally open). The actuating cylinder is controlled using a 5/2-way valve. The actuating cylinder can only be used for pulling.

- [1] The handling module HSP is in the right end position The actuating cylinder is advanced to its initial position
- [2] When the handling module reaches the left end position, the 5/3-way valve is reset (top left image)
- [3] When retracting, the actuating cylinder pulls the handling module upwards into its wait position. The work area is free (top right image)
- [4] From the wait position, you can either swivel to the start position or to the other end position

Max. Z-stroke wait position: see datasheet 'Wait position module'

Type code

001	Series	
HSP	Handling module	

002	Size [mm]	
12	12	
16	16	
25	25	

003	Drive system	
AP	Pneumatic semi-rotary drive	
AS	Drive shaft	

004	Protective devices	
	None	
SD	Protective cover	

005	Wait position module	
	None	
WL	Left	
WR	Right	

Datasheet

General technical data

Series	Handling module [HSP]					
Drive system	Drive shaft [AS]			Pneumatic semi-rotary drive [AP]		
Size	12	16	25	12	16	25
Pneumatic connection	–			M5		
Mode of operation	–			Double-acting		
Design	Drive shaft Cross guide Force pilot operated motion sequence			Cross guide Swivel module Wait position module optionally on left Force pilot operated motion sequence		
Cushioning	Noise reduction via buffers			Shock absorber at both ends, Soft characteristic curve		
Position detection	Via proximity switch					
Type of mounting	With through-hole Via slot nuts					
Mounting position	Guide rail, Vertical					

Operating and environmental conditions

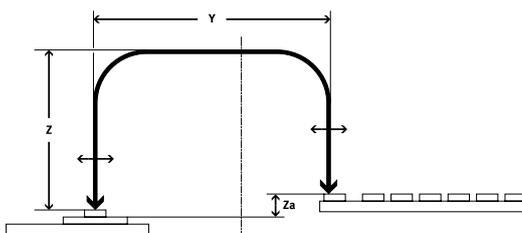
Series	Handling module [HSP]					
Drive system	Drive shaft [AS]			Pneumatic semi-rotary drive [AP]		
Operating medium	–			Compressed air to ISO 8573-1:2010 [7:--]		
Note on operating and pilot medium	–			Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	–			4 ... 8 bar		
Ambient temperature	0 ... 60°C					

Weight

Series	Handling module [HSP]					
Drive system	Drive shaft [AS]			Pneumatic semi-rotary drive [AP]		
Size	12	16	25	12	16	25
Product weight ¹⁾	1,800 ... 2,500 g	3,100 ... 4,300 g	6,200 ... 7,400 g	1,900 ... 2,600 g	3,300 ... 4,600 g	6,400 ... 7,600 g

1) Without protective hood / with protective hood

Stroke adjustment



Y-stroke:

- Once the HSP has been fitted, the Y-stroke of the pick and place positions can be adjusted independently of each other

Z stroke:

- Differences in height, for example between a rotary indexing table and a transfer system, can be compensated even after mounting.

Series	Handling module [HSP]					
Size	12		16		25	
Y stroke	52 ... 68 mm		90 ... 110 mm		130 ... 170 mm	
Z stroke	20 ... 30 mm		35 ... 50 mm		50 ... 70 mm	
Z stroke, working stroke	15 mm		20 mm		25 mm	

Wait position module



Series	Handling module [HSP]					
Size	12		16		25	
Max. Z stroke waiting position	15 mm		25 mm			

Datasheet

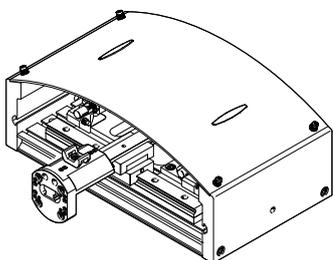
Materials

Material base plate	Wrought aluminium alloy
Material side components	Wrought aluminium alloy
Material cross-guide	Tempered steel

Forces, HSP-...-AP

Series	Handling module [HSP]		
Drive system	Pneumatic semi-rotary drive [AP]		
Size	12	16	25
Theoretical force at 0.6 MPa (6 bar, 87 psi)	40 N	50 N	65 N
Max. process force in Y direction	30 N	35 N	50 N

Repetition accuracy, HSP-...-AP

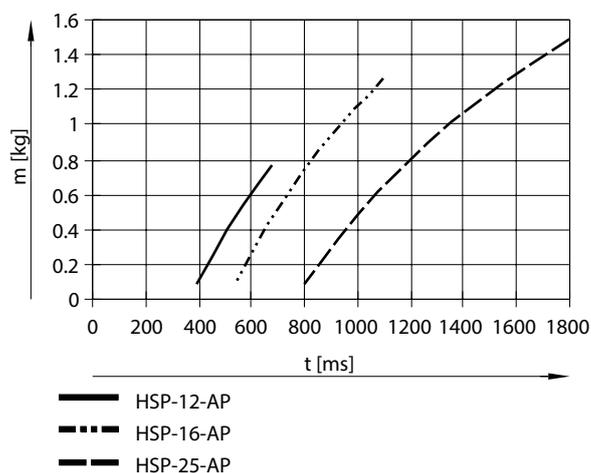


For low-vibration operation, the payload should be mounted as close as possible to the guide rail of the handling module.

Repetition accuracy is ensured if the payload (adapter plate, semi-rotary drive and/or gripper, gripper fingers, workpiece) is mounted within the mounting surface of the adapter kit HAPG.

Series	Handling module [HSP]		
Drive system	Pneumatic semi-rotary drive [AP]		
Size	12	16	25
Repetition accuracy	±0.01 mm		±0.02 mm

Travel time t as a function of payload m while maintaining the repetition accuracy, HSP-...-AP



The travel time t refers to the time the handling module needs to travel from one end position to the other and back.

The payload m refers to the mass fastened on the vertical guide rail (e.g. adapter, gripper, semi-rotary drive and workpiece).

Note:

It is possible to obtain higher speeds with the same mass by limiting the repetition accuracy.

Cycle times, HSP-...-AP

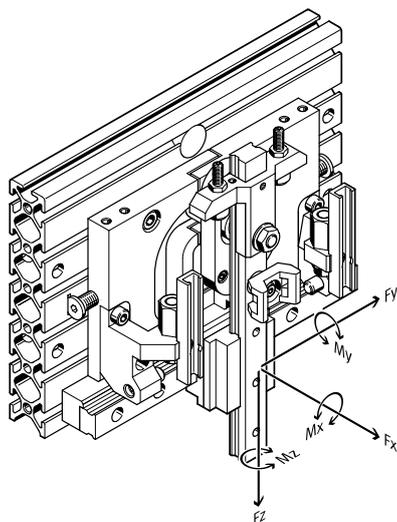
The cycle time tt is the sum of the travel time t and the dwell time te in the end positions.

The minimum cycle time must be complied with.

Series	Handling module [HSP]		
Drive system	Pneumatic semi-rotary drive [AP]		
Size	12	16	25
Min. cycle time	0.6 s	0.8 s	1 s

Datasheet

Load characteristics, HSP-...-AP



The torques apply to the centre of the guide carriage.

Series	Handling module [HSP]		
Drive system	Pneumatic semi-rotary drive [AP]		
Size	12	16	25
Max. torque Mx dynamic	1.1 Nm	2.4 Nm	3.2 Nm
Max. torque My dynamic	1.1 Nm	2.4 Nm	3.2 Nm
Max. torque Mz dynamic	1.1 Nm	2.4 Nm	3.2 Nm
Max. torque Mx static	5 Nm	10 Nm	15 Nm
Max. torque My static	5 Nm	10 Nm	15 Nm
Max. torque Mz static	5 Nm	10 Nm	15 Nm

Calculation of the load comparison factor, HSP-...-AP

$$f_v = \frac{|M_{x1}|}{M_{x2}} + \frac{|M_{y1}|}{M_{y2}} + \frac{|M_{z1}|}{M_{z2}} \leq 1$$

The torque equation for the combined load must be satisfied:

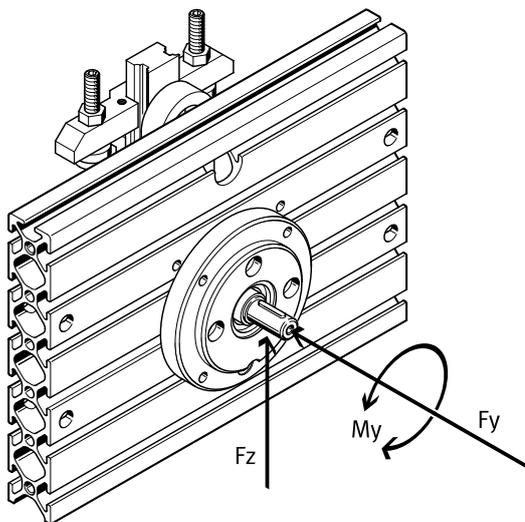
M1 = dynamic value

M2 = maximum value

Datasheet

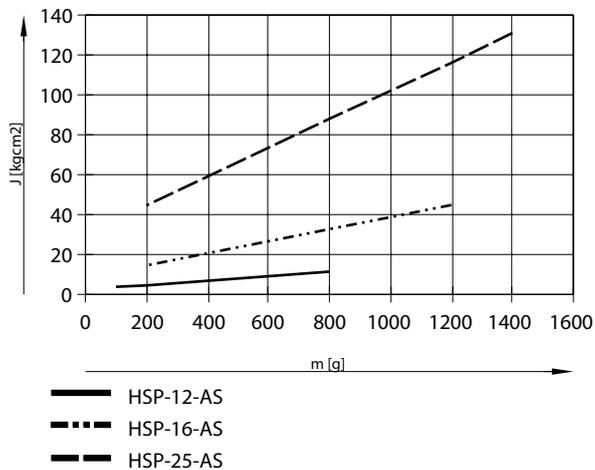
Load characteristics, HSP-...-AS

The torques apply to the centre of the shaft.



Series	Handling module [HSP]		
Drive system	Drive shaft [AS]		
Size	12	16	25
Max. axial force at drive shaft	18 N	30 N	50 N
Max. radial force at drive shaft	45 N	75 N	120 N
Max. drive torque at drive shaft	1.25 Nm	2.5 Nm	5 Nm

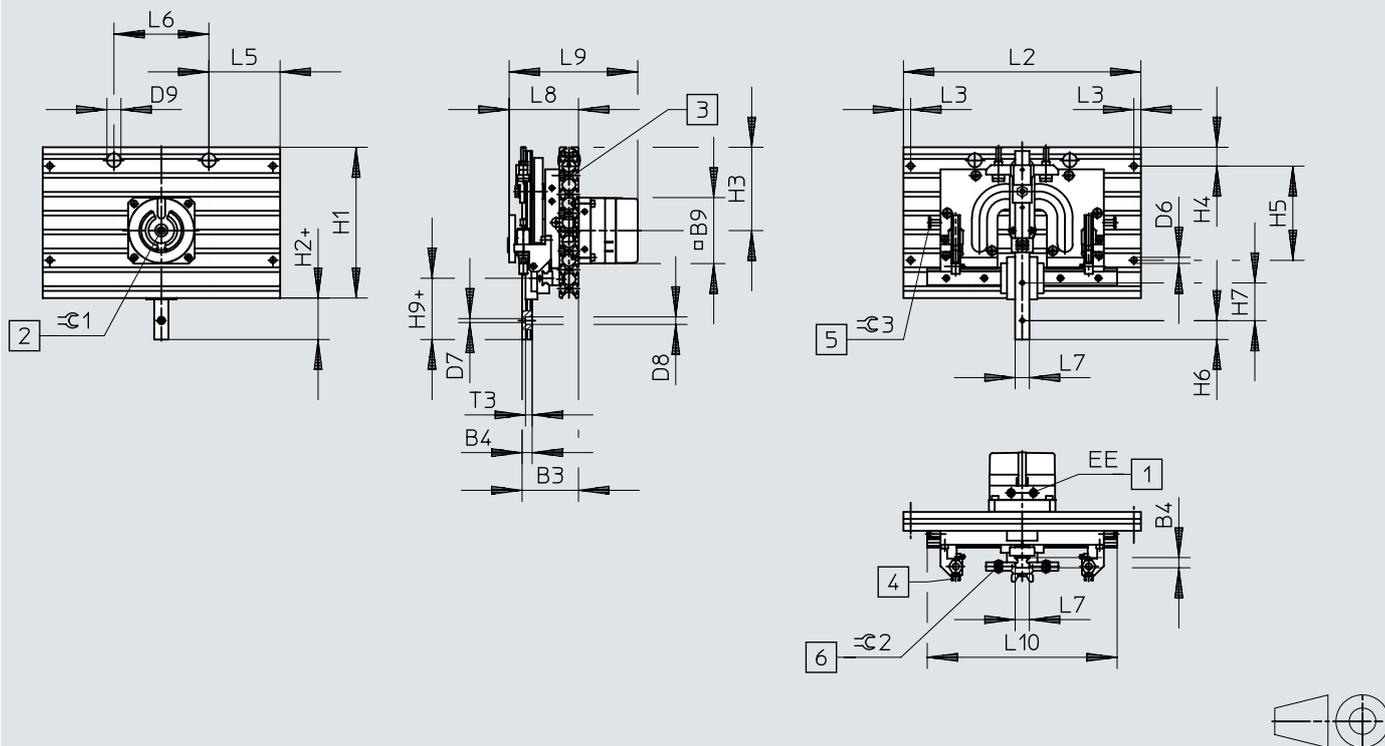
Mass moment of inertia J as a function of payload m (for drive design), HSP-...-AS



Dimensions

Dimensions – HSP-...-AP with semi-rotary drive DSM

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- [1] Compressed air ports
- [2] Manual override (internal hex)
- [3] Mounting slot for slot nut
- [4] Sensor slot for proximity switch SME/SMT-8
- [5] Adjusting screw for Y stroke
- [6] Adjusting screw for Z stroke

Dimensions

	B3 ±0,5	B4	B9	D6 ∅	D7 ∅	D8 ∅	D9 ∅
HSP-12	56	9 -0,03	56	6,3	3,5	6,2	13
HSP-16	60	10,6 -0,03	70	6,3	4,3	8	13
HSP-25	62	10 ±0,05	83	6,3	4,5	10	13

	EE	H1	H2 ±0,2	H3	H4	H5 ±0,2	H6
HSP-12	M5	120	34	66	40	40	12,5
HSP-16	M5	160	44	88,5	20	100	20
HSP-25	M5	200	75	110	40	100	20

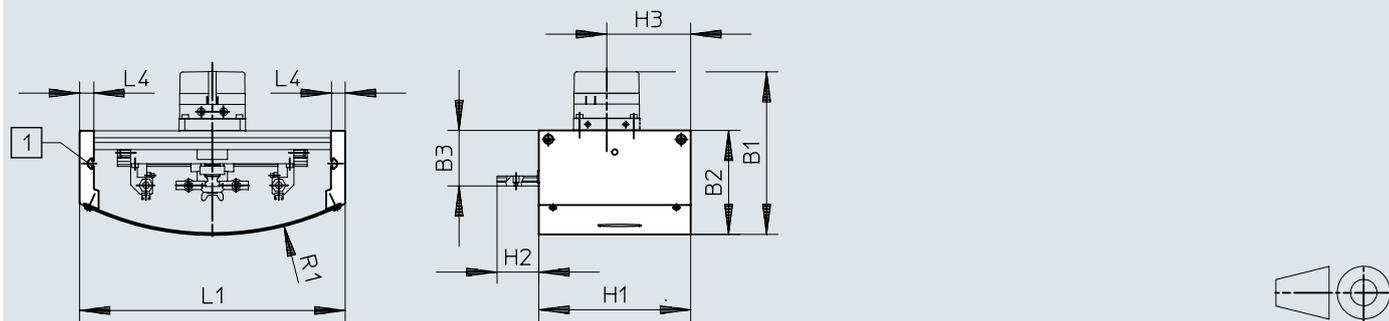
	H7	H9	L2 ±0,2	L3	L5	L6	L7
HSP-12	25	44	170	7,5	85	–	12 -0,01/-0,05
HSP-16	40	65	250	7,5	75	100	15 -0,01/-0,05
HSP-25	30	101	340	7,5	30	280	23,2 ±0,05

	L8 ±1,2	L9 ±2,8	L10	T3	≈G1	≈G2	≈G3
HSP-12	65	122	150	6	6	2	3
HSP-16	73	142	200	6,5	8	2,5	3
HSP-25	80	153	250	6,3	8	2,5	4

Dimensions

Dimensions – HSP-...-AP with semi-rotary drive DSM and protective hood

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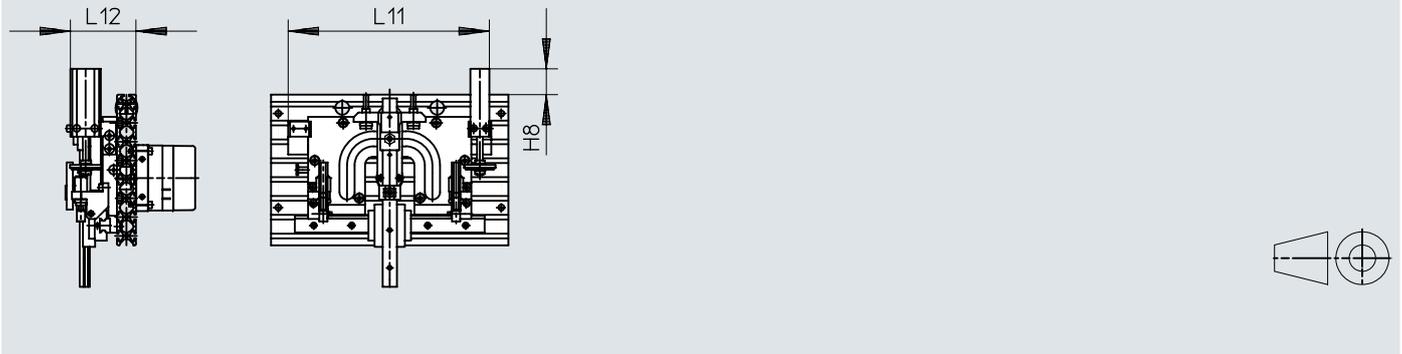
[1] Slot for proximity switch cable with slot cover

	B1	B2	B3	H1	H2	H3	L1	L4	R1
	±3	±2	±0,5		±0,2		±0,6		
HSP-12	150	93	56	120	34	66	200	15	200
HSP-16	179	111	60	160	44	88,5	280	15	306
HSP-25	188	115	62	200	75	110	370	15	484

Dimensions

Dimensions – HSP-...-AP with wait position module on the right

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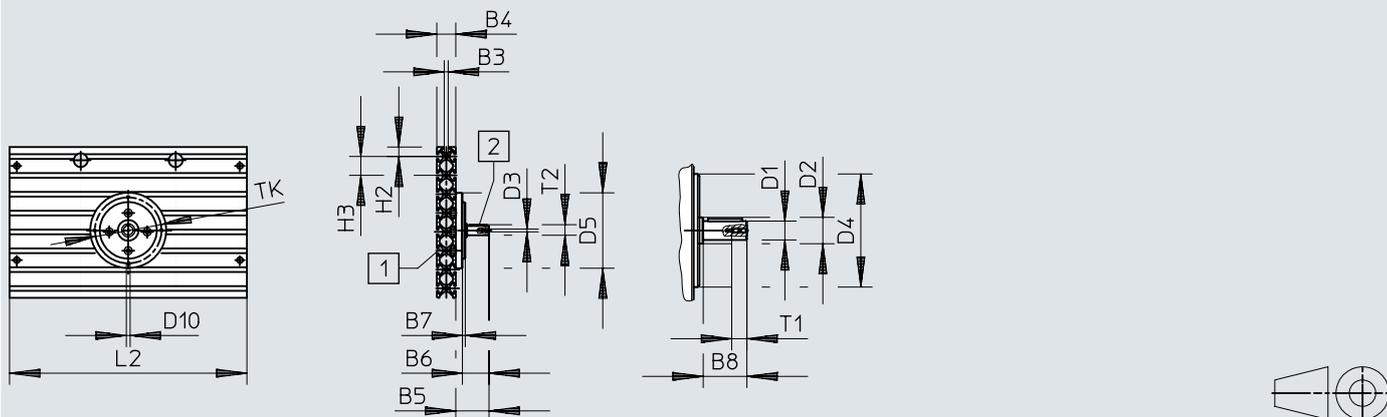
	H8	L11 ¹⁾	L12
HSP-12	30	141,5	64
HSP-16	33	210	69
HSP-25	13	277	79

1) If the Y stroke is increased, the change in stroke should be added to the dimension.

Dimensions

Dimensions – HSP-...-AS

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- [1] Mounting slot for slot nut
- [2] Featherkey

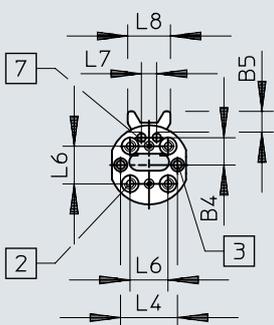
	B5	B6	B7	B8	D1 ∅ g7	D2 ∅	D3	D4 ∅ f8	D5 ∅	D10	L2 ±0,2	T1	T2 max.	TK ±0,1
HSP-12	29	22	3	17,5	8	12,5	M3	45	65	M4	170	9	8,8	55
HSP-16	35	28	3	23	10	14	M3	60	80	M4	250	9	11,2	70
HSP-25	44	36	4	30	12	17	M4	70	95	M5	340	10	13,5	82

Dimensions

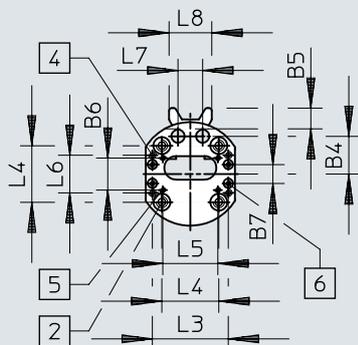
Dimensions – Adapter kit HAPG-B

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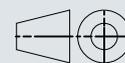
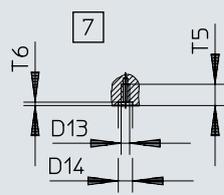
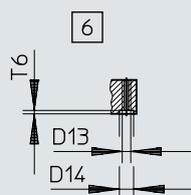
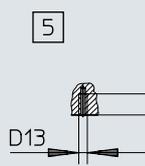
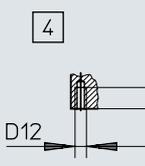
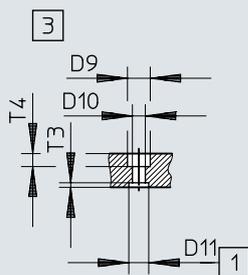
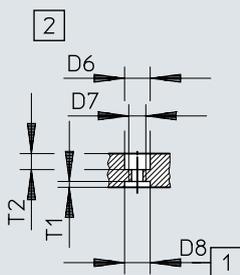
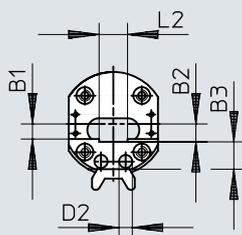
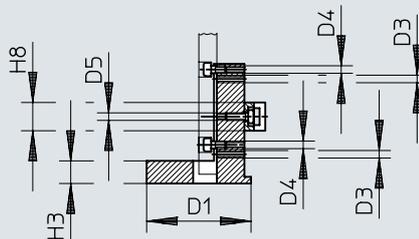
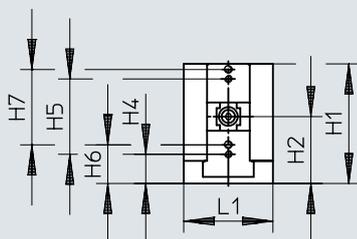
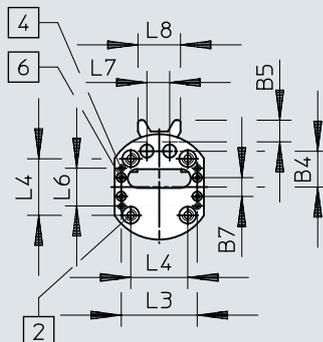
HAPG-70-B



HAPG-71-B



HAPG-72-B



- [1] Centring hole for centring sleeve ZBH
- [2] * Tolerance for centring hole ± 0.02

Dimensions

	B1	B2 +0,2	B3	D1 ∅	D2 ∅	D3	D4	D5	D6 ∅ +0,2	D7	D8 ∅ H7	D9 +0,2
HAPG-70-B	5	6	11,5	42	4,5	–	M3	M4	9	M6	9	8
HAPG-71-B	8	9,5	14,5	56	7	M4	M4	M4	9	M6	9	8
HAPG-72-B	8	9,5	15	56	7	–	M4	M4	9	M6	9	8

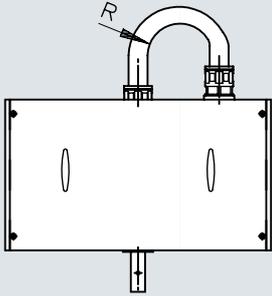
	D10 ∅	D11 ∅ H7	D12	D13	D14 ∅ H7	T1 +0,1	T2	T3 +0,1	T4 +0,1	T5 min.	T6 +0,1	H1
HAPG-70-B	4,5	7	M4	M3	5	2	5	1,5	4,5	7,5	1,2	50
HAPG-71-B	4,5	7	M4	M3	5	2	5	1,5	4,5	7,5	1,2	63,5
HAPG-72-B	4,5	7	M4	M3	5	2	5	1,5	4,5	7,5	1,2	60

	H2	H3	H4 +0,2	H5 ±0,2	H6 +0,2	H7 ±0,2	L1	L2 +0,1
HAPG-70-B	28,5	12	–	–	15	25	39	12
HAPG-71-B	35,5	12	15,5	40	20,5	40	47	15
HAPG-72-B	41,5	12	–	–	20,5	30	47	23,2

Dimensions

Dimensions – Installation kit MKRP

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		1)	2)
			∅ [mm]
HSP-12	MKRP-1	55	12
HSP-16	MKRP-2	75	16,5
HSP-25	MKRP-3	75	16,5

- 1) Max. bending radius for conduit
 2) Tubing I.D.

Ordering data

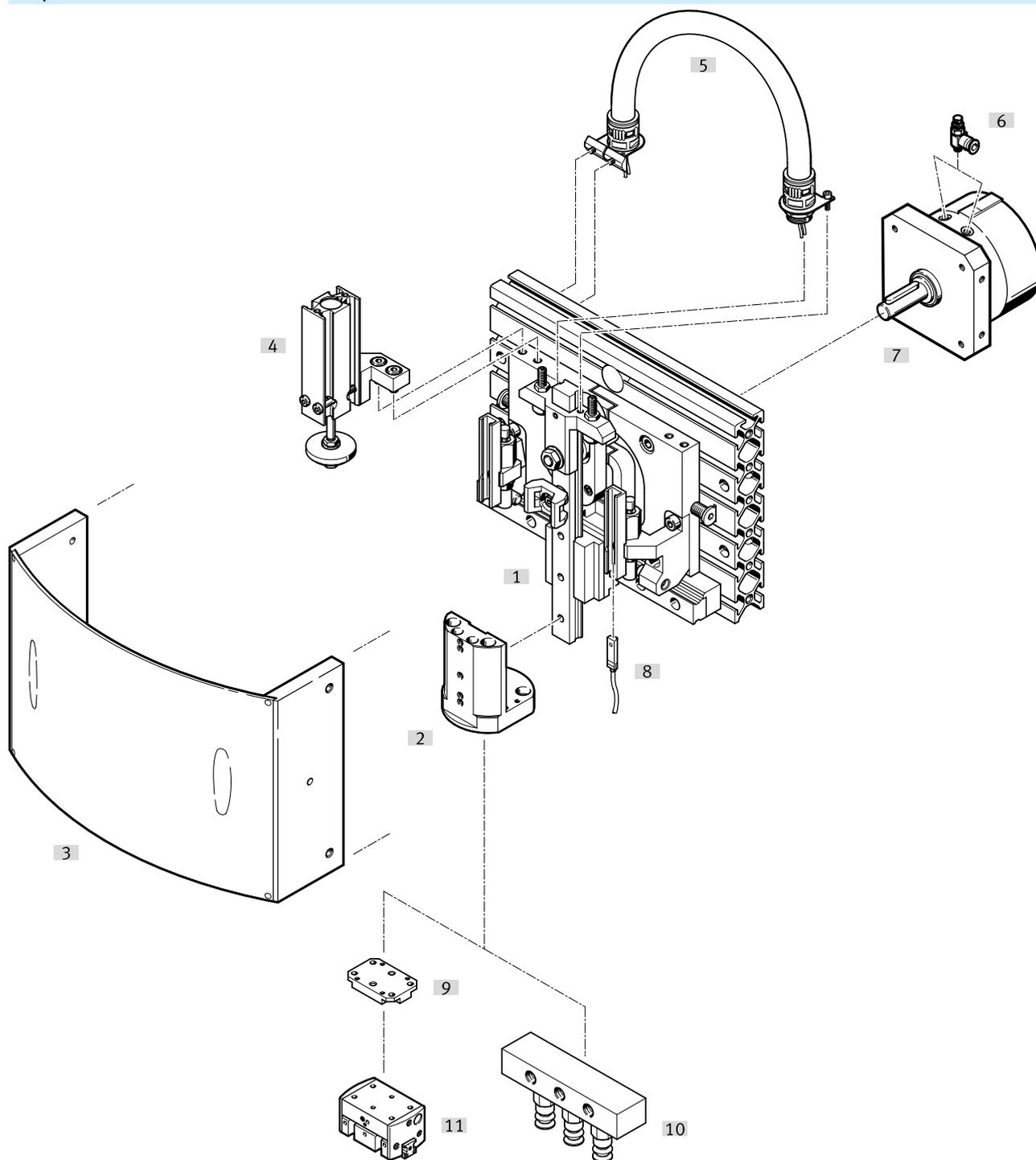
HSP-...-AP, without protective hood				
	Size	Wait position module	Part no.	Type
	12	None	533599	HSP-12-AP
		Left	533604	HSP-12-AP-WL
		Right	533603	HSP-12-AP-WR
	16	None	533607	HSP-16-AP
		Left	533612	HSP-16-AP-WL
		Right	533611	HSP-16-AP-WR
	25	None	533615	HSP-25-AP
		Left	533620	HSP-25-AP-WL
		Right	533619	HSP-25-AP-WR

HSP-...-AP, with protective hood				
	Size	Wait position module	Part no.	Type
	12	None	533600	HSP-12-AP-SD
		Left	533602	HSP-12-AP-SD-WL
		Right	533601	HSP-12-AP-SD-WR
	16	None	533608	HSP-16-AP-SD
		Left	533610	HSP-16-AP-SD-WL
		Right	533609	HSP-16-AP-SD-WR
	25	None	533616	HSP-25-AP-SD
		Left	533618	HSP-25-AP-SD-WL
		Right	533617	HSP-25-AP-SD-WR

HSP-...-AS				
	Size	Protective devices	Part no.	Type
	12	None	533605	HSP-12-AS
		Protective hood	533606	HSP-12-AS-AD
	16	None	533613	HSP-16-AS
		Protective hood	533614	HSP-16-AS-SD
	25	None	533621	HSP-25-AS
		Protective hood	533622	HSP-25-AS-SD

Peripherals

Peripherals overview



Accessories		→ Link
Type/order code	Description	
[1] Handling module HSP	Standard module without accessories	hsp
[2] Adapter kit HAPG	Interface for grippers, semi-rotary drives, etc.	20
[3] Cover kit BSD-HSP	To protect against accidental contact	20
[4] Wait position module BWL-/BWR-HSP	With pneumatic drive: Function for retracting the swivelling arm from the working area	20
[5] Installation kit MKRP	Conduit for protecting electrical cables and tubing	20
[6] One-way flow control valve GRLA	Speed adjustment for pneumatic actuators	grla
[7] Semi-rotary drive DSM	Pneumatic drive, adapted to each size	dsm
[8] Proximity switch SMT-8	Sensing option for end positions	20

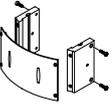
Peripherals

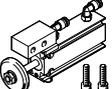
Accessories		→ Link
Type/order code	Description	
[8] Proximity switch SME-8	Sensing option for end positions	20
[9] Adapter kit	Interface between HSP and gripper	greifer
[10] Suction cup with connection	The right suction cup with connector for every application	vakuumsauger
[11] Gripper	Parallel/three-point/radial/angle grippers can be attached to the HSP. The right gripper for every application	greifer
[12] Slot nut HMBN	For mounting the handling module	21

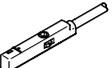
Accessories

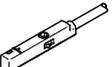
Adapter kit HAPG-B			
	Product weight	Part no.	Type
	55 g	540881	HAPG-70-B
	110 g	540882	HAPG-71-B
	115 g	540883	HAPG-72-B

Installation kit MKRP				
	Description	Product weight	Part no.	Type
	For size 12	150 g	533632	MKRP-1
	For size 16	160 g	533633	MKRP-2
	For size 25		533634	MKRP-3

Cover kit BSD-HSP				
	Description	Product weight	Part no.	Type
	For size 12	825 g	533635	BSD-HSP-12
	For size 16	1,350 g	533636	BSD-HSP-16
	For size 25	1,770 g	533637	BSD-HSP-25

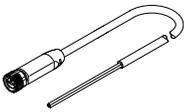
Wait position module BWL-/BWR-HSP for HSP-...-AP				
	Description	Product weight	Part no.	Type
	For size 12		533624	BWL-HSP-12
			533623	BWR-HSP-12
	For size 16		533626	BWL-HSP-16
			533625	BWR-HSP-16
	For size 25		533628	BWL-HSP-25
			533627	BWR-HSP-25

Proximity switch SMT-8M for T-slot, magneto-resistive Link smt							
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type	
	Screw-clamped, Insertable in the slot from above	3-wire NPN N/O contact	Open end	2.5 m	574338	SMT-8M-A-NS-24V-E-2,5-OE	
			Plug M8, A-coded	0.3 m	574339	SMT-8M-A-NS-24V-E-0,3-M8D	
		3-wire PNP N/C contact	Open end	7.5 m	574340	SMT-8M-A-PO-24V-E-7,5-OE	
			3-wire PNP N/O contact	Open end	2.5 m	574335	SMT-8M-A-PS-24V-E-2,5-OE
				Plug M8, A-coded	0.3 m	574334	SMT-8M-A-PS-24V-E-0,3-M8D

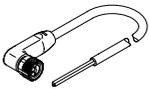
Proximity switch SME-8M for T-slot, magnetic reed Link sme						
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	3-wire N/O contact	Open end	2.5 m	543862	SME-8M-DS-24V-K-2,5-OE
			Open end	5 m	543863	SME-8M-DS-24V-K-5,0-OE
		2-wire N/O contact	Plug M8, A-coded	0.3 m	543861	SME-8M-DS-24V-K-0,3-M8D
			Open end	2.5 m	543872	SME-8M-ZS-24V-K-2,5-OE

Accessories

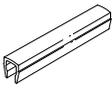
Connecting cables NEBA, straight

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	8078223	NEBA-M8G3-U-2.5-N-LE3
				5 m	8078224	NEBA-M8G3-U-5-N-LE3

Connecting cables NEBA, angled

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	8078230	NEBA-M8W3-U-2.5-N-LE3
				5 m	8078231	NEBA-M8W3-U-5-N-LE3

Slot cover ABP for T-slot

	Description	Packaging quantity [pieces]	Part no.	Type
	Length 0.5 m, Inserted from above	2	151680	ABP-5-S

Slot nut for base plate, HMBN

	Description	Product weight	Part no.	Type
	Can be inserted from above	1.8 g	189654	HMBN-5-M5-10